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Squaring (2) and remembering that $a+b+c=1-D$,

$$16m^4+8(4D-3)m^3+(24D^2-32D+5)m^2+(8D^3-14D^2+6D+2)m$$
$$+2D^2-2D^3-2(ab+ac+bc)=\mp 8(2m+8)\sqrt{[(m-a)(m-b)(m-c)]},$$

or $16m^4+Am^3+Bm^2+Cm+E=\mp 8(2m+8)\sqrt{[(m-a)(m-b)(m-c)]}$.....(3).

Squaring (3), $256m^8+32Am^7+(A^2+32B)m^6+(32C+2AB-256)m^5$

$$+[B^2+32C+2AC-2048+256(a+b+c)]m^4+[2AC+2BC$$
$$-4096+2048(a+b+c)-256(ab+ac+bc)]m^3+[C^2+2BE$$
$$+4096(a+b+c)-2048(ab+bc+ac)+256abc]m^2+[2CE$$
$$-4096(ab+ac+bc)+2048abc]m+E^2+4096abc=0.$$

This equation gives m and hence s, which finally gives x, y, z.

Solved in a similar manner by the *PROPOSER*.

177. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

Solve $m^{2x}(m^2+1)=(m^{3x}+m^x)m$.

Solution by MARCUS BAKER, U. S. Geological Survey, Washington, D. C.; CHARLES E. BASSETT, Central University, Danville, Ky.; and E. L. SHERWOOD, Shady Side Academy, Pittsburg, Pa.

The equation may be written $\dfrac{m^{3x}+m^x}{m^{2x}}=\dfrac{m^2+1}{m}$, or $m^x+\dfrac{1}{m^x}=m+\dfrac{1}{m}$,

whence $m^{2x}-\left(m+\dfrac{1}{m}\right)m^x=-1$, from which $m^x=m$ and $1/m$.

Therefore $m^{x\pm1}=1$ and $x\pm1=0$; $x=+1$ and -1.

Also solved by *G. W. GREENWOOD*, and *G. B. M. ZERR*. Professor Zerr finds by performing the indicated operations and factoring, in addition to the roots given above, the root $-\infty$.

GEOMETRY.

197. Proposed by L. C. WALKER, A. M., Graduate Student, Leland Stanford Jr. University, Cal.

Two points P_1, Q_1 are on a generator of a hyperboloid, and P_2, Q_2 the corresponding points on a confocal hyperboloid. Prove $P_1Q_1=P_2Q_2$.

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Let $x^2/a^2-y^2/b^2-z^2/c^2=x^2/\alpha^2-y^2/\beta^2-z^2/\gamma^2=1$ be the hyperboloid and its confocal;

P_1, $Q_1=(d, e, f)$, (h, k, l);

P_2, $Q_2=(m, n, p)$, (r, s, t). We are to prove,

$$(d-h)^2+(e-k)^2+(f-l)^2=(m-r)^2+(n-s)^2+(p-t)^2.$$